Liquidity Constraints and Firm's Export Activity*

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Abstract

This paper will assess the importance of firms' internal financial resources necessary to overcome the sunk entry costs associated with export. We propose a new methodology to identify *a priori* constrained firms, exploiting the information on assets and liabilities for a group of medium and small sized italian firms. We provide evidence that the entry probability is affected by the level of cash stock only for the constrained firms. However cash plays an important role also for trade's extensive margin growth. Finally, we do not find evidence that entry in the export market improves the firm's financial health, while *ex-ante* new entrants are relatively more leveraged.

Keywords: Credit constraints, Heterogenous firms, Trade

JEL Classifications: F10, F12, F13, L25, M20

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1 Introduction

In the recent literature of international trade and industrial organization, the existence of sunk cost associated with the export activity has been widely recognized; less attention has been devoted to understand how firms cover these costs.

In reality we observe a discrepancy between present cost and expected future profits; while costs are certain and immediately paid, revenues from export will be uncertain and collected later on. Entry costs are not negligible. For example Das et al. (2007) estimate the dimension of sunk costs for exporters. They calculate an average fixed entry cost of around $400.000 for Mexican exporters. If the capital market is characterized by asymmetric information and frictions, some firms will not be able to export ceteris paribus other conditions because they are not able to pay the entry's cost. The firms, which are not able to raise funds for financing their investments or projects (as exporting), will be defined *credit constrained*: a credit constrained firm relies largely on internal resources rather than external ones for financing its own investments[1]. This does not imply that the "non-constrained" firms do not use internal funds for investments (see Kaplan and Zingales, 1997); it means that some firms, which are not reliable from the financial institutions' point of view, are "constrained" to use their own liquidity even if not enough for their investments.

In this paper, we will analyze the empirical relationship between the firms' export behavior (entry) and internal financial factors. In particular, we try to define whether the firm's internal liquidity determines the internationalization process; both entry choice and extensive margin of trade (number of markets served) figures are considered.

The present paper is placed in the between of two streams of literature: the first one concerns the investments' sensitivity to cash flows to measure credit constrains, and the second one regards the relationship between exporting and credit constraints. In the former stream, since Fazzari et al. (1988), there has existed a large body of literature that analyses the sensitivity of investments to internal resources[2]. In the second stream of research the relation between export and financial health is exploited. This research may be classified into three subgroups of analysis. The first one analyses how credit availability affects the export's decisions (Campa and Shaver, 2003,

[1] We have no data about trade credits. Our research is not focusing on trade credits.
[2] Hubbard (1998) and Bond Van Reenen (2005) for a literature review.

Chaney, 2005, Manova, 2006, Muuls, 2008); the second describes whether the export activity eases credit constraints (Manole and Spatareanu, 2009); the third observes how financial health changes before and after entry into the export market (Greenaway et al., 2007; Bellone et al., 2010). In a more structured framework, Chaney (2005) introduces liquidity constraints into a model of international trade with heterogeneous firms (Melitz, 2003), so that liquidity becomes a second source of heterogeneity across firms[3]. Manova (2006) shows empirically that credit constraints determine both the zeros in bilateral trade flows and the variations in the number of exported products as well as the number of destination markets. Bermann and Hericourt (2010) find evidence that credit access is an important factor in determining the entry into the export market for firms in developing countries; however, they also show that exporting does not improve firms' financial health *ex-post*. The major findings are generally two. Firstly, exporters show better financial health compared to domestic firms Secondly, starters generally display low liquidity and high leverage, possibly due to the sunk costs associated to export markets (Greenaway et al., 2007). However Bellone et al. (2009) find that new exporters have an *ex-ante* financial advantage by comparison with non-exporters. Nonetheless, the causal relationship between export and financial health is still ambiguous, in particular whether the export activity have a positive effect on the firms' financial stability (Campa and Shaver, 2003; Manole and Spatareanu, 2009).

In this paper, we will empirically assess the role of internal liquidity as a key factor for the firm's internationalization process, and we show that internal liquidity is a key factor in particular for credit constrained firms. If the financial constraints shrink the investments' possibilities to the level of internal liquidity, it is quite straightforward to assume the existence of a similar relationship between the export activity and the firms' financial constraints: exporting involves investments as other firms' projects.

The paper is fundamentally composed of two parts. In the first one, we develop a new methodology to construct an index that is able to identify the firm's financial status *a priori*. Using a rich dataset for small and medium Italian enterprises, we are able to group firms depending on

[3]There exist a number of theoretical works in the field of financial development that deal with liquidity constraints as a source of comparative advantage (Matsuyama, 2005; Becker Greenberg, 2005); in a Ricardian comparative advantage framework, the basic prediction is that either all or no firms export in a given sector. Beck (2002, 2003) finds evidence of links between trade, financial development and credit access.

their level of credit constraints. This is possible, as one of the unique features of the dataset is that it provides detailed information about the firm's assets and liabilities. In particular the dataset allows us to consider firms that relies on bank loans to finance their activity (short term loans); small and medium size firms in Italy are usually subject to financial constraints due to size dimension, local bank system, and ownership structure (Caggese Cunat , 2010).

The novelty will consist in evaluating a firm from the point of view of an external investor; we consider in our methodology the firm's financial stability both in a long term and in a short term perspective. Then we empirically show that the amount of internal resources affects the entry probability into the export market for those firms identified as highly credit constrained. It implies that the firms, which are not able to borrow money from outside because not reliable, are forced to use internal cash to finance the investments for exporting.

The paper's contributions are twofold. From a methodological point of view, we suggest a different strategy for testing the hypothesis of liquidity constraints and export. Secondly, we show whether the firms are identified as constrained, their export choices are based on the level of liquidity. We find that large part of the resources used to start export activity are devoted to the innovation and development of new products; similarly the continuous exporters need liquidity also to upgrade existing products, in order to increase the number of destinations' markets (i.e., the extensive margin of trade). Finally, we provide evidence that entry into the export market does not increase financial health, but that new exporters are *ex-ante* more leveraged than non-exporters.

The rest of study is structured as follows. In Section 2 we present the data, describing the relevant characteristics and descriptive statistics. In Section 3 we introduce the motivations for the methodology proposed, and the strategy for identifying the credit constrained firms. In Section 4 we present the emprical specification and we discuss the results. In Section 5, we verify the effect of internal cash on the extensive margin of trade. In Section 6, we provide further analysis, and in Section 7 we conclude.

2 Data description: Capitalia surveys

Our main data sources are surveys and balance sheet information from Capitalia Bank (formerly MedioCredito Bank) for a group of medium and small size manufacturing firms. As stated in the introduction, the feature of the present data-set is that it provides detailed information about the assets and liabilities; it will allow us to construct an exogenous index that will define *a priori* the firm's financial status. The second important feature is presence of medium and small firms (not quoted in the stock market); we can focus our analysis on those enterprises that suffer more the scarcity of internal liquid resources.

The data are grouped in three surveys (the seventh, eighth, and ninth waves) that offer qualitative and quantitative information, while two balance sheet data-sets (1991-2000 and 2001-2003) provide information about assets and liabilities. The firms can be followed partially across all the three surveys and matched with balance sheet data-set.

One survey (the seventh Capitalia survey wave) covers the period from 1995 to 1997, while a second (the eighth wave) covers the period from 1998 to 2000, and the last consider the period 2001- 2003. From the surveys we recover information about the firm's export status, and other features as destination markets, or number of banks used by firms. We will mainly focus on the matching between the eighth and ninth survey: the use of the seventh survey drastically reduces the number of matched firms. Finally, the data in the surveys are not time-variant, so part of the empirical analysis is implemented with cross-section techniques. Merging the two surveys we are able to follow 2554 firms, and to observe the export status twice in time (Table B.4).

The information about revenues and costs are recorded in the balance sheets: here, we find yearly budget items from 1991 to 2000 and from 2001 to 2003 in thousands of Euros. The balance sheet provides a detailed statement of assets and liabilities as well as data about input values, turnover, and number of employees. The key information about short- and long-term debts, credit, assets, equity, and so on will be used to rank firms depending on their level of credit constraints. The matching among the two balance sheet allows us to follow 4668 firms.

Finally, firms are classified according with a two-digit ATECO 2002 industrial classification; sector codes and the descriptive statistics on the sector level are shown in Table B.2 (Appendix B). On average, the firms included in the surveys are small or medium-size in term of their number

of employees (less than 250). The variables are deflated using sector-specific indices (Source: EU-Klems).

It is important to notice that we have no information about the representativeness of the data-set by comparison with the Italian manufactures; for this reason, in Table 2.1, we compare the average growth rate of output per worker and labour productivity (value added per worker) for the firms in the sample and with the correspondent values at the aggregated level. The averages are calculated using balance sheet information[4], while the aggregated averages are obtained from the EU-Klems data-set. The averages are reported for the different sectors as well as for at the level of aggregated manufactures. We can observe that the firms in the surveys grow three times more than the correspondent value at aggregate level: the results do not change in terms of output per worker and labour productivity. Thus, we can reasonably suppose that the firms in the surveys are "good" in terms of performances even tough they are medium-small in size and employment (Tab. B.2).

Table 2.1: Average growth rates: comparative analysis from 1996 to 2003[‡].

	Labor Productivity		Output Per Worker	
Sector	Capitalia	EU-Klems	Capitalia	EU-Klems
DA	0.119	0.035	0.077	0.035
DB	0.103	0.020	0.069	0.038
DC	0.090	0.039	0.365	0.038
DD	0.094	0.030	0.065	0.034
DE	0.044	0.024	0.102	0.039
DG	0.086	0.020	0.120	0.037
DH	0.087	0.006	0.085	0.019
DI	0.102	0.033	0.094	0.049
DJ	0.088	-0.019	0.067	0.012
DK	0.081	0.020	0.055	0.021
DL	0.135	0.026	0.107	0.026
DM	0.110	0.033	0.091	0.061
DN	0.082	0.028	0.057	0.030
Total	0.098	0.024	0.087	0.032

[‡] Source: Our calculation from Capitalia and EU-Klems data-sets. Average growth rates by sector and for all manufactures are reported. Labor Productivity is value added per worker. Weighting the growth rates does not change the averages.

3 Identification of constrained firms

We want to verify the hypothesis that availability of financial resources affects the entry decisions. Given that we can interpret sunk cost for exporting as an investment, we are going to apply an

[4]The observations used consider the firms present on both balance sheets (from 1991 to 2000 and from 2001 to 2003). The first and last centile of observations are eliminated from the mean's calculation to avoid outliers. The averages are calculated for 1996 to 2003.

approach close to the investments' Euler equation (Bond and Van Reenen, 2005). Our objective is to proceed differently from previous literature. Instead of approximating liquidity constraints with different indices, and then plug them directly into the export regression, we prefer to identify *a priori* the constrained firms. In this section we are going to develop and test a new strategy to identify the firms according with their level of financial health. We proceed as follow: first we introduce the motivations for our approach, then we explain the methodology, and finally we demonstrate the robustness of our procedure.

3.1 Motivations

If we state that exporting is associated with sunk costs, and these costs require to be financed, we can comfortably place our problem in the framework of investments' sensitivity to cash flows[5] (Fazzari et al., 1988): the export is interpreted as any other activity that requires an investment. In its original formulation, firms are credit constrained whether the firms' investment level has a positive and statistically significant relationship with cash flows (or other indicators of internal liquidity); this implies that firms rely mostly on internal resources rather than external ones for their projects. Differently, in the presence of perfect capital markets, financial variables should have no impact on the investment decisions of firms: internal and external financing are supposed to be perfect substitutes with perfect capital markets if an investment is profitable. Relaxing the assumption of perfect capital market, the cost of internal and external financing may differ for several reasons. The theory of investments and credit constraints has been applied to a different research analysis (Konings et al., 2002; Love 2003; Forbes, 2007; Poncet et al.,2009)

If we want to test the effects of liquid resources on the entry probability, we cannot proceed with a simple empirical model, where liquidity explains export status. It is not always true that high cash flows generate more investments just for the credit-constrained firms. Kaplan and Zingales (1997) show the existence of a positive relationship also for the "healthy" firms; they rank *a priori* firms according with their level of credit constraints, and they find for a sample of large American enterprises that firms with a good financial situation invest more, if they own more liquid resources[6]. It introduces a high level of heterogeneity in our empirical analysis.

[5]The theory of the Euler equation of investments is similar to the Q-Tobin model.

[6]The sample is composed by firms quoted in the stock market. They prefer to self-finance their investments to signal their good standing and to maintain financial stability.

We can observe different cases. A firm may enter into the export market without problems, even if it owns a low level of liquidity; the firm uses external financing to support its investments because not credit constrained. On the other hand the healthy firms self-finance own export activity (Kaplan and Zingales (1997), even if they can access to financial markets. An empirical analysis that want to evaluate the effects of financial resources on the entry probability has to include these concerns. For this reason is important to identify *a priori* the level of credit constraints to assess the role of internal financing for each group. The new identification's methodology contributes is in this direction.

3.2 Identification Strategy

The identification strategy for the firms' credit constraint is divided in two steps. In the literature many indices were used to assess financial stability, as the liquidity ratio and the leverage ratio by Greenaway et al. (2007)[7]. The use of these indices directly in the export equation may generate biased results as explained in the previous section: not necessarily the highly leveraged firms are constrained, and the use internal cash to finance activities does not imply credit constraints. As Bellone et al.(2010) underline, these indices miss also the differences between short term and long term financial stability. A firm can be liquid in the short period but highly leveraged in the long period, and vice-versa: it has an impact on the credit access for a firm. Another shortcoming of the traditional indices is the endogeneity with the export status, because there are no clear priors behind the index's construction. Our method to evaluate credit constraints is similar to Bellone et al.(2010), when we try to control for different forms of financial stability. In addition we use a different perspective to assess the financial health, borrowing from business economics indices and thresholds used to evaluate the firm's financial stability.

Now let's define our strategy. In the first step we define the credit-constrained firms, calculating financial ratios from the data contained in the balance sheets. The indices obtained are usually employed in the literature of business economics to evaluate the "goodness" of an investment[8]. More recently, these indices have been used by banks to assess credit risk, according with

[7]The liquidity ratio is defined as a firm's current assets minus its short-term debt over total assets; the leverage ratio is the ratio of firm's short-term debt to current assets

[8]For more specific discussion of this subject, see Brealey-Myers (1999). The names given are not always the same across the literature; they sometimes change.

the fair-minded criteria imposed by the Bank for International Settlements (2006). Our objective is to observe and to evaluate a firm from the point of view of an external investor, which judge the firm's reliability from balance sheet data and the correspondent ratio. Then the reliability of the indices is tested using survey information about credit needs; we need verify that the ratios capture the firm's liquidity needs. Finally, in a second step, we separate firms into four groups, aggregating the indices.

To simplify our task we are going to consider two indices, for which conventional thresholds exist: the presence of a rule of thumb for them will help us to classify firms. In addition, the present indices are taken into consideration because they evaluate the firm's financial situation from different point of views, namely short term and long term's financial stability[9]. Incidentally, the threshold satisfaction does not imply financial health, or necessarily ensure firm's profitability: the indices may depend on particular combinations of balance sheet items that vary depending on accounting conditions[10].

- The indicator for long term's financial stability[11] is named *Financial Independency Index* (FII onward); it evaluates to what degree a firm is self-financing its economic activity (in a broad sense). It is defined as the ratio between the total amount of internal resources (equity plus cash flows) and the total amount of capital invested (total assets). The optimal ratio is fixed at greater than or equal to .33, meaning that at least one third of the firm's assets must be financed (covered) by internal resources (Brealey and Myers, 1999). However, an index much larger than .33 may suggest small firm size in term of capital utilization (low level of total assets).

- The index for short term's financial stability is a rough measure for the cash's availability, and it is given by the ratio of instantaneous liquidity or cash assets (cash, bank and current account) to short-term debts (interests, furniture, wages...). It is named *Quick Ratio* (QR hereafter), and the optimal value is fixed greater than 1: if it is the case, a firm owns sufficient resources to face the daily cost of production process. In light of this, the ratio

[9]The use of a third index for long term's financial stability does not modify the qualitative results of our analysis. We use to indices to simplify the clustering process.

[10]For these reasons, many indices are usually employed to evaluate firms, as well as other information are taken into consideration. If an index is much larger than the threshold proposed, this does not necessarily imply financial health, but they suggest some additional problems with the financial stability of the firm.

[11]In Appendix A there is an extensive description of the data as well as index construction.

indicates a firm's chances of paying off short-term debts without the need for additional external funds.

In Table B.1 are reported the ratios' means, and the standard deviations. Now we need to understand if the indices described above have a link with the firm's credit constraints. Intuitively, we can state that if the ratios increase, the firm's financial health improves. A firm gathers more easily funding from external resources, because it offers more collaterals. To test the relationship between the indices, and the firm's financial constraints, we are going to explain the firm's perceptions of credit's needs with the illustrated ratios. For this purpose, the surveys (the eighth and ninth) provide two interesting information that may be captured by a dichotomous variable. Therefore we define two dummy variables. The first question asks if a firm has asked more credit from external sources without getting it. The corespondent dummy, labeled *Ask*, will take value one if a firm did not get credit, otherwise it takes a value of zero. The second question asks if a firms would have desired more credit than the amount received. The correspondent dummy, labeled *Des* takes a value one if a firm would have desired more[12], otherwise zero. The two dummies may be considered as proxies for a firm's credit constraints (Caggese Cunat, 2010). By using these dummies, we try to understand how financial indicators are related to firms' credit needs. For this reason we estimate a discrete choice model in cross section (one for each survey, annd dummy). The dependent variables are *Des* or *Ask* for firm i in one of the two surveys. The financial variables are the dependent variables, and they are defined both in levels (QR or FII), or as dichotomous variables, i.e. if QR or FII are above the threshold (1 and 0.33) the respective indicators (DQR or $DFII$) take value one.

In other word, we estimate the probability of firm's credit satisfaction depending on the indices, as well as the correspondent thresholds' fulfillment; a negative sign in both cases (dummy or level) implies that whether the ratio is high enough (i.e., FII is above 0.33), the probability that a firm perceives itself as credit constrained decreases. The results are reported in Tables 3.1 and 3.2.

[12]Table B.3 in Appendix B shows the descriptive statistics for the dummies. The first table reports the relationship between the surveys in 2000 and 2003. The table below reports the transitional matrix for the dummies from 2000 to 2003. The variation in the number of observations depends on the fact that in the 9^{th} survey, few firms answered to the question concerning credit obtained *Ask*.

Table 3.1: Credit needs: financial index dummies‡.

	(1) Ask_{i00}	(2) Ask_{i03}	(3) Des_{i00}	(4) Des_{i03}
DFII_i	-0.051***	-0.097	-0.108***	-0.065***
	[0.008]	[0.085]	[0.014]	[0.020]
DQR_i	-0.023***	-0.147*	-0.088***	-0.088***
	[0.009]	[0.076]	[0.014]	[0.020]
TFP_i	-0.008	0.030	-0.025***	-0.029***
	[0.005]	[0.038]	[0.008]	[0.010]
Log(KL)_i	0.009**	0.011	-0.001	0.027***
	[0.004]	[0.031]	[0.007]	[0.008]
Obs.	3835	288	3928	1809
Pseudo R^2	0.044	0.050	0.050	0.060
χ^2	84.156	19.038	178.27	94.044

‡ Source: Capitalia. Robust standard errors clustered by regions are in squared brackets. Ask_{i00} and Des_{i00} are the dependent variables coming from the 8^{th} survey. Sector dummies and regional dummies included, but not reported. The regressors are contemporaneous to the dependent variables. TFP_i is the firm's TFP by Levinshon Petrin (2003). Log(KL)_i is the log of capital intensity.

Table 3.2: Credit needs: financial index levels‡.

	(1) $\text{Ask}_{i00}00$	(2) Ask_{i03}	(3) Des_{i00}	(4) Des_{i03}
FII_i	-1.626***	-1.691***	-1.601***	-1.215***
	[0.279]	[0.651]	[0.222]	[0.286]
QR_i	-0.245**	-0.050	-0.221**	-0.200
	[0.121]	[0.195]	[0.098]	[0.123]
TFP_i	-0.060	0.090	-0.099***	-0.125***
	[0.045]	[0.101]	[0.033]	[0.046]
Log(KL)_i	0.099**	0.089	0.031	0.150***
	[0.040]	[0.087]	[0.030]	[0.037]
Obs.	3835	288	3928	1809
Pseudo R^2	0.063	0.068	0.060	0.071
χ^2	100.80	23.091	169.96	86.041

‡ Source: Capitalia. Robust standard errors clustered by regions are in squared brackets. Ask_{i03} and Des_{i03} are the dependent variables coming from the 9^{th} survey. Sector dummies and regional dummies included, but not reported. The regressors are contemporaneous to the dependent variables. TFP_i is the firm's TFP by Levinshon Petrin (2003). Log(KL)_i is the log of capital intensity.

We observe that a firm is less likely to perceive itself as credit-constrained[13], when the firm's ratios are above the given threshold, both for $DFII$ and DQR; moreover we note that an increase in the financial ratios produces the same results. Thus, it seems that the ratios are able to capture in some way the level of the firm's constraints, or at least ratios demonstrate how firms

[13]For the paper's aims, the two dummies (Des and Ask) can be used directly as explanatory variables for the entry probability in the export market, or alternatively they can be instrumented by the ratios FII and QR, in case of endogeneity problems. We do not chose this approach for two main reasons. First of all, the firms that provide this information changes across survey, and in particular we have few information for the ninth survey, the year of entry in the export market[14]: we will not have enough observations to obtain asymptotically efficient results. Secondly, the answer to the survey's questions are potentially biased, because firms may aim to complain about their financial status, when they report information to the data collector (Capitalia Bank).

perceive their financial situation. In addition, it is interesting to notice that as the productivity [15](TFP) increases, the firm's probability to realize itself insufficiently financed decreases, while it is the opposite for capital labor ratio (KL); more efficient firms find it easier to finance their investments (with both internal and external resources), while capital intensive firms have more financial needs.

We employ the ratios for cluster firms in four different groups, such that we can identify *a priori* the firm's financial condition. We define four groups, using the dummies defined by indices' thresholds ($DFII$ and DQR). The more credit constrained firms (cluster zero) are the ones that do not fulfill the requirements for short term and long term stability, namely firms with both dummies equal to zero. In Table 3.3 it is illustrated how clusters are constructed.

Table 3.3: Cluster definition

Clusters	0	1	2	3
Dummies	DFII=0; DQR=0	DFII=0; DQR=1	DFII=1; DQR=0	DFII=1; DQR=1
Description	No short term, nor long term stability	No long term stability	No short term stability	Both ratios satisfied

It is important to underline that we construct both a time-variant, and a time-invariant ranking. In the former case, group membership may change every year if ratios change. In the latter, as in Kaplan Zingales (1997), the index is time-invariant. The firm's dummies are defined using as benchmarks the ratios' averages across the entire period (from 1997 to 2003). Table 3.4 reports summary statistics (averages) for each time-invariant group. It is evident[16] that half of the firms are in the potentially highly constrained group (group 0); however firm's clustering does not determine a rank for the variables reported such as investment intensity[17] (INV/KB), cash intensity ($C.Stock$ or $C.Flow$ over KB), productivity (TFP) or export participation ($Expo03$). Secondly, firms in groups 0 and 1 generate lower cash stock and are less leveraged (Bond); however, the relative debt load ($Bond/KB$ or $EquityR$) decreases if firms are classified as less credit-constrained; this is probably an effect of the methodology used to cluster firms. Finally, it is interesting to note that firms in groups 0 and 1 have a production level. (Y), which is not

[15]TFP is the Total Factor Productivity estimated using the Levinsohn-Petrin technique (2003).

[16]The statistics in Table 3.4 does not change if we provide averages using the time-variant index. A more detailed description of variables can be found in Appendix A.

[17]KB indicates the stock of tangible fixed asset at the begin of period t (Love, 2001). Look to Appendix A for the definition.

very different from that of group 3.

Table 3.4: Averages by time invariant index[‡].

Index	INV	Y	C.Stock	C.Flow	TFP	Bond	Banks03	Firms
0	820.36	24293.51	4525.64	2692.64	4.50	2197.34	5.51	1409
1	327.64	19863.47	4230.65	2293.33	4.56	2153.29	4.58	388
2	3867.91	57682.60	14858.16	10575.55	4.91	5943.60	5.24	181
3	972.12	22545.35	7737.21	4486.10	4.15	2011.09	4.07	575
Total	997.32	25576.24	5939.53	3595.45	4.46	2411.28	5.01	2553

Index	Inv/KB	Y/KB	C.Stock/KB	C.Flow/KB	Bond/KB	EquityR	Expo03	Dest03
0	0.20	44.53	1.68	0.86	0.59	0.44	0.70	1.53
1	0.18	15.03	2.31	1.02	0.29	0.25	0.62	1.55
2	0.17	3.54	0.78	0.43	0.13	0.10	0.64	1.36
3	0.16	7.28	2.29	1.03	0.13	0.06	0.68	1.66
Total	0.18	28.72	1.85	0.89	0.40	0.30	0.68	1.55

[‡] Source: Our calculations from Capitalia. Firm is the number of individual in a given time invariant category. TFP is the total factor productivity calculated with Levinsohn Petrin (2003). KB is the value of tangible fixed asset calculated at the beginning of period t.

The clusters identify *a priori* whether a firm is potentially constrained or not; it is likely that a firm in group 0 or 1 will incur difficulties to finance its investments with external resources, because they do not appear reliable in the long term: as consequence they are forced to use internal liquidity. This seems reasonable if we look at average debt intensity ($Bond/KB$) in Table 3.4.

In order to verify the reliability of our clustering process, we test if the internal liquidity (cash) explains the firm's investments level, using the Euler equation's models (see Hubbard et al., 1998 or Bond Van Reenen, 2003 for a survey). We expect a positive and significant relation for those firms that are assumed to be credit constrained; i.e., in group 0 and 1 firms do not guarantee at least long term's financial stability. This will mean that the firms raise their investments if they own sufficient internal resources.

The estimated empirical model derives from a Euler equation for investments, and following Love (2003), we define it as

$$\left(\frac{Inv}{KB}\right)_{it} = \alpha_0 \left(\frac{Inv}{KB}\right)_{it-1} + \alpha_1 \left(\frac{Y}{KB}\right)_{it-1} + \alpha_2 \left(\frac{CS}{KB}\right)_{it-1} + \alpha_3 TFP_{it-1} + \delta_t + c_i + u_{it}. \tag{3.1}$$

where δ_t, c_i, and u_{it} are respectively time dummies, fixed effects and the *i.i.d.* error term. The variables are scaled by the level of tangible assets evaluated at the begins of each period t (KB), rather than the contemporaneous value of capital[18] (K); the liquidity is approximated

[18] Love, 2003; and Forbes, 2007

by cash stock (CS) rather than cash flows[19]. Unlike in the previous literature, we introduce as additional variable the firm's TFP, because we know from Tables 3.1 and 3.2 that more productive firms are more satisfied with their financial situation. As in the previous regression, the TFP is calculated using the Levinsohn Petrin method (2003) to avoid problems with the assumption on the monotonicity of investment function (Olley and Pakes, 1996). In Appendix A the regression's variables and the depreciation's method are described.

3.3 Euler Equation estimation

The objective of this section is to ascertain which kind of relationship exists between investments and internal liquidity in each cluster. We expect that α_2 from Eq. 3.1 will be positive for group zero (0) and one (1), because those clusters define for us *a priori* the financial constrained firms[20].

The equation 3.1 presents several estimation issues (Love, 2003; Forbes, 2007). The first concern regards the presence of fixed effects c_i, jointly with potential endogenous regressors: consequently, the within estimator may be biased. Second, the dependent variable with a one-period lag is employed as an explanatory variable; it introduces a problem of estimator consistency because of the correlation between the error terms. To solve these problems, the equation 3.1 is usually estimated using a "difference-GMM" estimator for the dynamic panel (Arellano and Bond, 1991). The equation 3.1 is taken in first difference, and all regressors of 3.1 are considered endogenous; we start from the third lag of the variables in levels to instruments first differences, since that second lag instruments are endogenous[21] for the Hanse/Sargan test. As additional variable, we introduce the "equity ratio" to control for the relative level of debt to the total assets ($EquityR_{it}$). Table 3.5 reports the estimation results. In the first column, the Euler equation is estimated considering all firms in the data-set, while in the other four columns, Eq. 3.1 is estimated cluster by cluster.

[19] The use of cash flows does not change the results.

[20] Given the characteristics of the firms, we do not expect to find results similar to those of Kaplan and Zingales (1997); here we deal with SMEs, not quoted firms, so the need does not exist to signal financial stability to the stock market.

[21] For a more detailed discussion of the estimation of the Euler equation for investments, see Love (2003) and Forbes (2007).

Table 3.5: Euler Equation: Difference GMM by cluster[‡].

	(1) All1	(2) CL0	(3) CL1	(4) CL2	(5) CL3
IKB_{it-1}	-0.398***	-0.642***	-0.222***	-0.416*	-0.134
	[0.073]	[0.173]	[0.070]	[0.215]	[0.112]
$CSKB_{it-1}$	0.011***	0.011***	0.119***	0.148	-0.002
	[0.001]	[0.002]	[0.030]	[0.187]	[0.014]
YKB_{it-1}	-0.000***	-0.000***	0.006	0.089*	0.022***
	[0.000]	[0.000]	[0.008]	[0.046]	[0.007]
TFP_{it-1}	0.012	-0.654	-0.163	-0.633	-0.057
	[0.374]	[0.675]	[0.543]	[0.879]	[0.160]
$EquityR_{it-1}$	0.015	0.074	-0.041	0.240	-0.102
	[0.075]	[0.096]	[0.261]	[0.645]	[0.733]
Obs.	7258	3992	1060	508	1698
Firms	2209	1215	332	153	509
Instr.	32	32	32	32	32
AR2 Test	0.942	0.235	0.483	0.155	0.134
Hansen Test	0.153	0.713	0.376	0.710	0.228

[‡] Difference GMM estimation. Variables in log. Robust standard errors in squared brackets. Time dummies included both as variables and instruments. One step estimator used. Significance level: * is the p-value>0.1, ** is the p-value>0.05, and *** is the p-value>0.01. Instr: total number of instruments. P-Value reported for AR2 Test and Hansen test. CL is the time constant cluster. Firms included in the estimation are the result of matching between balance sheet 1991-2000 and 2001-2003. All regressors are considered endogenous and are instrumented from the 3rd lag. Investments, sales and cash stock are scaled with the capital value at the beginning of period KB.

As we suspected, we find that the investments for firms in cluster 0 and 1 are sensitive to the level of internal liquidity (time constant clusters). The Euler equation analysis seems to support the robustness of our clustering method[22]. The firms without a strong financial stability in the long term are constrained in their investments, given that the same investments depend on the internal level of financial resources.

At first glance, the specifications in columns 2 and 3 suggest that the investments' sensitivity is larger for firms in group one rather than in group zero; *ceteris paribus* other factors, a 10% increase for the CF/KB ratio raises the investments of 0.1% and 1.2% respectively for firms in groups 0 and 1. However, using the standardized impact approach, this gap almost disappears, showing that the marginal effects are not different among the two groups. We can compute that an increase of one standard deviation[23] above the mean for the CF/KB ratio of groups

[22]The results do not change even if we use system GMM estimator (Table B.7). Instead if we use time variant clustering the sign of cash's coefficients do not vary (Table B.8), however the statistical significance has decreased. In this last case instead of runing four separate equations, we run one single equation, where the cash stock (or cash flow) variable is interacted with zero-one dummies for cluster membership. We obtain a positive and significant coefficient for the interaction term between cash stock and the dummy equal one for cluster 0 and cluster1 (Col.1 and Col2). The interaction with cash flow is not significant (Col.3 and Col4).

[23]The standard deviation of $CSKB$ is 22.66 for group 0 and 3.18 for group 1. The means are reported in Table 3.4.

0 (13.49=22.66/1.68) and 1 (1.37=3.18/2.31) increases the investment by 14.8% and 16.3% respectively. Thus, the classification produced to identify credit-constrained firms appears quite reliable, and the long term stability seems to characterize the financial status. To validate our results, we check the "goodness" of our instruments with Hansen's test of over-identifying restrictions; the reported p-values confirms the orthogonality between the instruments, and the error terms. Similarly, we report for the second-order autocorrelation test (AR2 Test) the p-values, where the null is defined as the absence of correlation between error terms[24].

To conclude, the empirical evidence suggests that investments depend on the level of internal resources for firms belonging to group zero or one. As long as we assume the existence of sunk cost associated with exporting, we expect to find similar relationship between the entry probability and internal liquidity for those firms that are credit-constrained.

4 Entry and credit constraints

In this section, we verify the idea that internal liquidity determines the entry in the export market, and in particular for credit-constrained firms. Theoretical and empirical research has demonstrated at the firm level the existence of a sunk investment associated with exporting; the financially constrained firms can rely only on internally generated cash to overcome this cost and begin exporting. For this reason, we estimate a discrete choice model (probit) considering non-exporters and new exporter from 8^{th} and 9^{th} survey; by matching the two surveys, it is possible to examine 778 firms in twelve different manufacturing sectors. The estimated model (4.1) follows the non-structural approach of Roberts et al.(1997) or Bernard and Jensen (1999): it can be written as

$$Entry_{i03} = \begin{cases} 1 & \text{if} \quad G\left(\alpha_0 CS_{i00} + \sum_{c=0}^{3} \alpha_c X_c CS_{i00} + \beta_n \mathbf{Z(n)}_{i00} + \gamma + \epsilon_i\right) > 0 \\ 0 & \text{otherwise} \end{cases} \tag{4.1}$$

where $Entry_{i03}$ is the entry status of firm i in the 9^{th} survey[25], and ϵ_i is the *i.i.d.* error term

[24] In addition, robustness checks are reported in Table B.7 using the "system GMM" estimator. Additionally, if we interact the cash stock variable with cluster dummies we obtain the same results (upon request) both with difference and system GMM estimators.

[25] The G function is a normal distribution. The variable $Entry_{i03}$ assumes a value of 1 if a firm starts to export between the 8^{th} and the 9^{th} survey, otherwise it assumes a value of 0.

Unlike the Euler equation (3.1), we do not scale the level of cash with tangible fixed assets; the fixed costs of exporting are assumed to be equal across firms since that the 90% of new exporters start to export in Europe. We control the differences in technology with sector dummies and regional dummies. The coefficients of interest are the $\alpha's$, namely the coefficient of liquidity index cash stock (α_0), and the interaction effect between liquidity and clusters (α_c). The α coefficients capture the net effect of liquidity in year 2000 on the entry probability: a positive sign will mean that the export probability rises whether the level of internally generated cash increases. However, given the number of observations, we cannot run regressions by groups, because we need to maintain a sufficient level of observation to guarantee the asymptotic efficiency. We prefer to consider only interaction term[26]: in other words the firms considered in this exercise are a sub-sample of firms used in the Euler equation's estimation. In Table 4.1, entrants and domestic firms are reported for time-invariant clusters, while summary statistics for exporters are presented in Table B.4.

Table 4.1: Entry and domestic by cluster[‡].

Export \ Cluster	0	1	2	3	Tot.
Domestic	328	124	46	158	656
Entrants	76	17	8	21	122
Tot.	404	141	54	179	778
Ent./Tot.	0.188	0.121	0.148	0.117	0.157

[‡] Ent./Tot: ratio entrants to the total number of firms observed. Even if we observe from the survey 778 firms between domestic and entrants, we are going to use only 550 firms, because some firms do not report information about variables of interest.

To make our analysis more robust, we introduce some control variables $\mathbf{Z(n)}_i$. The controls come form two data source. The first group of a firm's control variables are defined in year 2000 and they are extrapolated from balance sheet data (subscript 00). The second group of controls define a firm's activity in the time period of the 9^{th} survey (subscript 03). In the former group are included productivity (TFP), capital intensity (KL) and the labor force (Lab) in year 2000, as well as the cash stock taken in logarithmic terms; in the latter group are included information about the number of banks ($Bank$), R&D indicator (a dummy variable) or product innovation's effort (dummies $UpProd$ or $NewProd$). Finally, sector and regional dummies (γ) are included in

[26] We interact the cash stock level in the year 2000 (CS_{i00}) with the (X_c) dummy, which identifies the clusters' membership. If we run the probit cluster by cluster, we find that CS_{00} positively affects the entry probability for the firms in cluster zero i.e., the more constrained firms. In this case, 330 observations are used.

the estimation[27]. The marginal effects (average marginal effect) of Eq. 4.1 are directly reported in Table 4.2; then we can interpret the coefficients as elasticities (i.e., variation in the probability of entry due to variations in the variables of interest).

Table 4.2: Probit estimation: entrants versus domestic[‡].

	(1) Exp_{i03}	(2) Exp_{i03}	(3) Exp_{i03}	(4) Exp_{i03}	(5) Exp_{i03}	(6) Exp_{i03}	(7) Exp_{i03}
Log(CS)_{i00}	0.057	0.073	0.066	0.070	0.064	0.063*	0.058
	[0.045]	[0.045]	[0.045]	[0.047]	[0.048]	[0.034]	[0.051]
$\text{X}_0\text{Log(CS)}_{i00}$		0.016***	0.018***	0.018***	0.019***	0.014***	0.014***
		[0.004]	[0.005]	[0.005]	[0.005]	[0.003]	[0.003]
$\text{X}_1\text{Log(CS)}_{i00}$		0.005	0.006	0.005	0.004	0.004	-0.000
		[0.014]	[0.013]	[0.014]	[0.012]	[0.012]	[0.009]
$\text{X}_2\text{Log(CS)}_{i00}$		0.010	0.011	0.010	0.011	0.010	0.004
		[0.011]	[0.010]	[0.011]	[0.009]	[0.008]	[0.015]
Bank_{i03}	0.017***	0.013***					0.013**
	[0.005]	[0.004]					[0.006]
$\text{R\&D}_{i03}$			0.048				-0.003
			[0.031]				[0.019]
Deloc_{i03}				0.088			0.031
				[0.102]			[0.077]
UpProd(H)_{i03}					-0.076**		-0.079**
					[0.034]		[0.033]
UpProd(M)_{i03}					-0.041		-0.054*
					[0.047]		[0.029]
NewProd(H)_{i03}						0.078**	0.116***
						[0.031]	[0.020]
NewProd(M)_{i03}						-0.012	0.034*
						[0.016]	[0.018]
TFP_{i00}	-0.001**	-0.001	-0.001	-0.001	-0.001	-0.001**	-0.001
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Log(KL)_{i00}	0.020	0.010	0.012	0.013	0.018	0.011	0.022*
	[0.016]	[0.012]	[0.014]	[0.015]	[0.014]	[0.012]	[0.013]
Log(L)_{i00}	-0.016	-0.030	-0.016	-0.019	-0.008	-0.024	-0.017
	[0.046]	[0.044]	[0.054]	[0.056]	[0.057]	[0.037]	[0.045]
Obs.	458	458	461	458	448	490	428
Pseudo R^2	0.109	0.121	0.119	0.113	0.116	0.103	0.145
Wald Test		0.00	0.00	0.000	0.000	0.000	0.000

[‡] Marginal effect reported. Robust standard and clustered by region standard errors are in squared brackets. Sector and region dummies included. X_0, X_1, and X_2 are dummies that take value 1, if a firm is respectively in cluster 0, 1 and 2. Significance level: * is the p-value>0.1, ** is the p-value>0.05, and *** is the p-value>0.01. The Wald test reports the p-value for the joint test of significance for Log(CS)_{i00} and three interacted variables: the null is that the four coefficients are not jointly different from zero

First of all, we note that cash stock (value in year 2000) has no effect on the entry probability, while the interaction with the dummy X_0 is always positive and significant; in the case of credit-constrained firms (cluster zero), we observe a statistically significant effect of internally generated cash. Given that we report marginal effects, we observe that an increase by 10% in the level of cash stock raises the entry probability by almost 0.18%. More precisely, since cluster 3 is omitted (for reasons of multicollinearity), the marginal effect has to be interpreted by comparison with the group of the less constrained firms. The coefficient for $Log(CS)$ is the average marginal effect

[27] The data description is reported in Section A.

for omitted group, while interacted terms report the extra gain for the other clusters. Then, the 10% increase in cash stock raises the entry probability for more constrained firms by an additional 0.2% , fi compared with the entry probability of not-constrained firms[28] (for which $Log(CS)$ is not statistically different from zero). Finally, the joint test of no statistical significance (wald test) is always rejected. In Table 4.3 we report the unconditional (column A) and conditional probability of entry in the export market, obtained from Table 4.2, by clusters. We can notice that the gap between the conditional probability of entry for cluster 0 and 3 widens when we introduce in the regression the interacted terms (From column 2 to column 6). The gap almost disappears in the case of conditional probability without clustering (column 1); the use of cash stock alone smoothes the entry probability across groups.

Table 4.3: Unconditional and conditional probability[‡].

	A	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Cluster	P(E)	P(E|CS)	P(E|CS;X)	P(E|CS;X)	P(E|CS;X)	P(E|CS;X)	P(E|CS;X)	P(E|CS;X)
0	0.188	0.261	0.318	0.319	0.301	0.313	0.292	0.337
1	0.121	0.238	0.186	0.184	0.178	0.184	0.187	0.198
2	0.148	0.252	0.244	0.237	0.226	0.272	0.275	0.249
3	0.117	0.244	0.187	0.198	0.189	0.186	0.192	0.216
Overall	0.157	0.253	0.261	0.263	0.249	0.258	0.251	0.280

[‡] P(E) is the unconditional entry probability. P(E|CS) is the probability of entry conditional to cash stocks. P(E|CS;X) is the entry probability conditional to cash stock and clustering.

To conclude, the reported results suggest that the firms need resources to cover fixed entry costs associated with export; firms in cluster 0 experience difficulty to secure financing from external investors, and they rely more on internal financing. The results in column 6 and 7 from Table 4.2 help us to understand better what are exactly the investments associated with exporting. In column 6, we observe that high efforts for product innovation (dummy $NewProd(H)$) increase the entry's probability, while product upgrading (dummy $UpProd$ in column 5) does not affect export status. We can reasonably believe that that entry into a new market entails the development of a new product[29] whereas the strengthening of a firm's market position maybe require product upgrading. Product innovation is an fundamental activity to start export activity(Aw et al., 2010; Van Beveren and Vandenbussche, 2010). To conclude it is worthwhile to note that the number of banks has a positive impact on entry probability: more banks suggest

[28] If we omit cluster 0 instead of 3, the signs of the coefficients become negative. If we employ a time variant clustering, it does not change the estimation results. If we estimate the entry probability on the balance sheet data in year 2003, the results do not change.

[29] To match foreign tastes, fulfill security or environment norms, to pass quality test.

a larger pool of potential investors.

In order to make more robust our analysis we are going to define a little bit differently our measure of internal liquidity, and control variables. Since that we do not know in which year the firms started to export, because of the nature of surveys' construction, we used balance sheet information from year 2000 to define Table 4.2 . Now we are going to consider the mean of firms' balance sheet information from year 2001 to 2003 (period of reference form the 9^{th} survey). Therefore, the log of cash stock, capital intensity, labor force, and productivity will be defined as mean from 2001 to 2003[30]. The results are reported in Table 4.4.

Table 4.4: Probit estimation: entrants versus domestic - 2001/2003 mean[‡].

	(1) Exp_{i03}	(2) Exp_{i03}	(3) Exp_{i03}	(4) Exp_{i03}	(5) Exp_{i03}	(6) Exp_{i03}	(7) Exp_{i03}
Log(MCS)_i	0.032	0.067	0.067	0.071	0.066	0.063	0.042
	[0.042]	[0.047]	[0.047]	[0.047]	[0.044]	[0.043]	[0.048]
$\text{X}_0\text{Log(MCS)}_i$		0.018***	0.020***	0.020***	0.021***	0.017***	0.017***
		[0.005]	[0.005]	[0.005]	[0.005]	[0.004]	[0.004]
$\text{X}_1\text{Log(CS)}_{i00}$		0.004	0.005	0.005	0.003	0.003	0.000
		[0.011]	[0.010]	[0.011]	[0.009]	[0.008]	[0.005]
$\text{X}_2\text{Log(MCS)}_i$		0.013	0.014	0.012	0.013*	0.012	0.006
		[0.009]	[0.009]	[0.009]	[0.008]	[0.008]	[0.009]
Bank_{i03}	0.014**	0.008					0.009
	[0.007]	[0.007]					[0.009]
$\text{R\&D}_{i03}$			0.064*				0.024
			[0.033]				[0.021]
Deloc_{i03}				0.082			0.041
				[0.127]			[0.094]
UpProd(H)_{i03}					-0.042		-0.051
					[0.040]		[0.041]
UpProd(M)_{i03}					0.013		-0.005
					[0.067]		[0.035]
NewProd(H)_{i03}						0.093**	0.121***
						[0.037]	[0.030
NewProd(H)_{i03}						0.038*	0.085***
						[0.022]	[0.026]
MTFP_i	-0.045**	-0.042*	-0.034**	-0.037*	-0.035**	-0.035**	-0.037
	[0.021]	[0.023]	[0.017]	[0.022]	[0.017]	[0.014]	[0.030
Log(MKL)_i	0.027*	0.007	0.008	0.009	0.018	0.005	0.024
	[0.016]	[0.014]	[0.016]	[0.017]	[0.014]	[0.014]	[0.015]
Log(ML)_i	0.023	-0.010	-0.010	-0.009	-0.000	-0.024	0.011
	[0.053]	[0.053]	[0.060]	[0.061]	[0.059]	[0.053]	[0.056]
Obs.	521	521	524	521	509	555	486
Pseudo R^2	0.089	0.103	0.107	0.100	0.1062	0.092	0.131
Wald Test		0.00	0.00	0.000	0.000	0.000	0.000

[‡] Marginal effect reported. Robust standard and clustered by region standard errors are in squared brackets. Sector and region dummies included. X_0, X_1, and X_2 are dummies that take value 1, if a firm is respectively in cluster 0, 1 and 2. Significance level: * is the p-value>0.1, ** is the p-value>0.05, and *** is the p-value>0.01. The Wald test reports the p-value for the joint test of significance for Log(MCS)_i and three interacted variables: the null is that the four coefficients are not jointly different from zero.

As we can see, the main message does not change. An increase in the average level of liquidity for more constrained firm eases the overcoming of fixed cost associated to export: credit con-

[30] More precisely we take the log of the mean.

strained firms increase their probability of entry in international markets. Finally, the investment effort for the development of new products is again positively significant ($NewProd(H)_{i03}$). In Table B.9 are reported the conditional probabilities.

In order to test more the robustness our results, we perform a further robustness check's exercise. We change the discrete measure of credit constraints (the four clusters) with a continuous measure: we construct a standardized index ($Stindex$) that is calculated using the FII and QR ratios in levels. In order to calculate a continuous index, we determine for each sectors the standardized averages for the two ratios. The index can be written as

$$StIndex(C)_{isx} = \sum_{x} \left(\frac{Ind_{isx}}{\overline{Ind}_{sx}} \right), \tag{4.2}$$

where Ind_{isx} is one of the two indices (FII or QR) for firm (i) in sector (s), while $\overline{Ind}_{sx}$ is the corresponding mean for sector (s); as $StIndex$ increases, the firm's financial stability increases[31]. Table B.1 provides descriptive statistics for 4.2. We interact $StIndex$ with the mean of cash stock, and we plug it into Eq. 4.1. Now the interaction term is expected to be negative; as the $StIndex$ increases the firms are less constrained, and the internal resources are less important to determine to entry into the export market. Also in this case we define the control variable as in Table 4.4.

[31] This is not necessarily true for a very high value of $StIndex$ given that the optimal financing mix is "ideally" a balanced combination between equity and debt.

Table 4.5: Probit estimation: entrants versus domestic (continuous index)‡.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Exp_{i03}	Exp_{i03}	Exp_{i03}	Exp_{i03}	Exp_{i03}	Exp_{i03}	Exp_{i03}
Log(MCS)$_i$	0.090**	0.089*	0.092**	0.096**	0.090**	0.087**	0.062
	[0.040	[0.046]	[0.045]	[0.045]	[0.037]	[0.040]	[0.043]
StIndex*Log(MCS)$_i$	-0.011***	-0.011***	-0.012**	-0.012**	-0.012***	-0.011***	-0.011***
	[0.004]	[0.004]	[0.005]	[0.005]	[0.005]	[0.004]	[0.003]
Bank$_{i03}$		0.008					0.010
		[0.006]					[0.008]
R&D$_{i03}$			0.069**				0.029
			[0.035]				[0.021]
Deloc$_{i03}$				0.095			0.045
				[0.134]			[0.086]
UpPRod(H)$_{i03}$					-0.042		-0.052
					[0.044]		[0.044]
UpPRod(M)$_{i03}$					0.012		-0.008
					[0.065]		[0.033]
NewProd(H)$_{i03}$1						0.088**	0.115***
						[0.036]	[0.028]
NewProd(M)$_{i03}$						0.040	0.088***
						[0.025]	[0.027]
MTFP$_i$	-0.042**	-0.050**	-0.042**	-0.044*	-0.044**	-0.042***	-0.045
	[0.017]	[0.023]	[0.019]	[0.023]	[0.018]	[0.015]	[0.031]
Log(MKL)$_i$	0.015	0.019	0.019	0.020	0.032**	0.016	0.035**
	[0.013]	[0.012]	[0.014]	[0.014]	[0.013]	[0.014]	[0.016]
Log(ML)$_i$	-0.020	-0.004	-0.006	-0.006	0.005	-0.021	0.011
	[0.047]	[0.049]	[0.055]	[0.056]	[0.053]	[0.048]	[0.054]
Obs.	555	521	524	521	509	555	486
Pseudo R^2	0.083	0.101	0.105	0.098	0.101	0.091	0.128

‡ Marginal effect reported. Robust standard and clustered by region standard errors are in squared brackets. Sector and region dummies included. Significance level: * is the p-value>0.1, ** is the p-value>0.05, and *** is the p-value>0.01.

Table 4.5 shows the results with the continuous proxy ($StIndex$) for credit constraints. The sign of the interaction term is negative as expected, and it remains constant across different specifications. In addition, the effect of the cash stock (Log(MCS)$_i$) is positive and significant almost all specification at 5% level.. The interpretation is quite straightforward: when the internal liquidity rises, the entry probability increase too, but the positive effect shrinks for high level of $StIndex$, i.e., the benefits from cash tends to disappear as long as the firm's financial stability increases. if Log(MCS)$_i$ increases by 10%, the entry probability raises by 0.11% for the average value of $StIndex$. With a simple calculation, an increase of Log(MCS)$_i$ reduces entry, whether $StIndex$ is above 8.09 (column 2); this is never the case in our sample. Finally, in column 6 and 7 we note that the innovation effort dummy is positive and significant ($NewProd(H)_{i03}$), as well as R&D dummy. It supports our previous idea that the resources necessary to start export activity are mainly focused on product innovation.

5 Destination Markets

In this section, we perform a second type of analysis to control whether exporting in an additional market (variation in the extensive margin of trade) is affected by the level of internal liquidity. The estimated model is similar to Eq. 4.1 us'ing as dependent variable the growth in markets' destinations. More precisely we have in the dataset information about export destinations for macro-regions[32]. So we consider as dependent variable the difference between the number of destinations' markets in the 8^{th} survey, and the destinations' market reported in the 9^{th} survey. However, unlike Eq. 4.1, we are going to consider in our analysis a subsample of continuos exporters, i.e., the exporters that increase their destinations' markets[33]. Given that our aim is to understand whether the choice to serve an additional market involves an additional sunk cost, we focus only on the expansion of the extensive margin of trade (number of markets). Quitters, entrants and continuous-domestic firms are excluded from the regression, in order to eliminate any type of noise that biases the estimation. The inclusion of new entrants, quitters, or domestic firms would have introduced more complexity since other choices, different from our main focus, could by driven by other factors. To test whether an increase in the markets depends on the firms' internal liquidity (and financial health) we estimate a non-linear count model (Poisson model), where the dependent variable is the discrete variations in the number of market served ($\Delta Dest_{i03}$). The results[34] are reported in Table 5.1.

We notice that the estimated coefficient for $Log(CS)$ is positive and significant: as the average liquidity increases of 10%, the average probability to increase market destination rises of around 1.8%. The positive correlation exists even if we introduce among control variables the lagged value for the log of destinations' markets ($Log(Dest)_{i00}$). The lagged value for the extensive margin of trade does not affect its growth in the subsequent period.

Additionally, we observe that an extra gain from internal liquidity exists for those firms that are not highly constrained, i.e. firms with constraints in the short term (cluster 2). More precisely, since we are evaluating the importance of internal cash for the groups 0, 1, and 2 with respect of group 3, the coefficients have be interpreted by comparison with the excluded cluster

[32]The survey asks if a firm exported to one of nine regions of the world during the period under consideration.

[33]The dependent variable is a discrete positive variable, and it ranges from 0 (no extra market) to 4 (more than 4 new market served). In Table B.5, we report the transitional matrix for exports' destinations.

[34]An ordered logit model provides the same qualitative results.

Table 5.1: Entry in new markets[‡]

	(1) $\Delta Dest_{i03}$	(2) $\Delta Dest_{i03}$	(3) $\Delta Dest_{i03}$	(4) $\Delta Dest_{i03}$	(5) $\Delta Dest_{i03}$	(6) $\Delta Dest_{i03}$	(7) $\Delta Dest_{i03}$
Log(Dest)$_{i00}$	0.057	0.066	-0.031	0.013	-0.009	0.010	-0.007
	[0.080]	[0.091]	[0.046]	[0.049]	[0.066]	[0.055]	[0.086]
Log(MCS)$_i$	0.170***	0.182***	0.164***	0.186***	0.150***	0.166***	0.136***
	[0.042]	[0.041]	[0.035]	[0.041]	[0.029]	[0.033]	[0.023]
X$_0$Log(MCS)$_i$		0.012	0.012	0.014*	0.015	0.014**	0.012
		[0.013]	[0.009]	[0.008]	[0.010]	[0.006]	[0.013]
X$_1$Log(MCS)$_i$		0.037**	0.035**	0.033**	0.035**	0.038***	0.029
		[0.018]	[0.015]	[0.016]	[0.018]	[0.013]	[0.024]
X$_2$Log(MCS)$_i$		0.028**	0.033***	0.034***	0.033***	0.034**	0.038***
		[0.014]	[0.012]	[0.013]	[0.012]	[0.014]	[0.014]
Bank$_{i03}$	-0.005	-0.006					-0.011
	[0.018]	[0.022]					[0.018]
R&D$_{i03}$			0.231***				0.200***
			[0.051]				[0.059]
Deloc$_{i03}$				0.076			0.119
				[0.127]			[0.142]
UpProd(H)$_{i03}$					0.204		0.045
					[0.223]		[0.214]
UpProd(M)$_{i03}$					0.286		0.180
					[0.245]		[0.228]
NewProd(H)$_{i03}$						0.387***	0.324**
						[0.135]	[0.144]
NewProd(M)$_{i03}$						0.243***	0.230***
						[0.091]	[0.087]
MTFP$_i$	-0.012	-0.012	0.004	0.017	0.018	-0.002	0.054
	[0.033]	[0.027]	[0.029]	[0.029]	[0.041]	[0.026]	[0.042]
Log(MKL)$_i$	-0.069	-0.075	-0.073	-0.084	-0.034	-0.074	-0.021
	[0.150]	[0.145]	[0.144]	[0.145]	[0.155]	[0.143]	[0.171]
Log(ML)	0.009	-0.021	-0.016	-0.021	0.006	-0.031	-0.004
	[0.063]	[0.059]	[0.059]	[0.048]	[0.048]	[0.048]	[0.028]
Cons.	-1.121*	-1.220*	-1.309*	-1.339**	-1.630***	-1.382**	-1.754***
	[0.625]	[0.671]	[0.674]	[0.651]	[0.572]	[0.653]	[0.595]
Obs.	727	727	729	727	694	733	676
N	727	727	729	727	694	733	676
Wald	0.000	0.000	0.000	0.000	0.000	0.000	0.000

[‡] Poisson regression. Robust and cluster by region standard errors are reportedin squared brackets. Sector and region dummies included. Significance level: * is the p-value>0.1, ** is the p-value>0.05, and *** is the p-value>0.01. The Wald test report the p-value for the joint test of significance for Log(MCS)$_i$ and three interacted variables: the null is that the four coefficients are jointly not different from zero. Log(Dest)$_{i00}$ is the log of destinations' markets in the eight survey (year2000)

(i.e., the less constrained firms) as we discussed for Table 4.2. If we consider column 3, in the case of firms in cluster 2 (without short term stability), an increase of 10% in the cash stock augments the probability of an additional market for an additional 0.3% with respect to not-constrained firms[35].

To better interpret the results, it is important to emphasize that we are running regressions among continuous exporters that are expanding their number of markets served; more precisely, we are considering firms that are already internationalized, and they are currently expanding their activities abroad. The sunk costs are partially paid when they start to export; in the current case, firms are just facing an additional fixed cost of exporting, and they already have experience of

[35] Alternative estimation using the log growth rate of markets provides the same results.

international markets. We know from the data (Tab. B.6) that continuous exporters are relatively more leveraged (BK) than other firms, but the cluster position is on average better than new exporters (0.946 vs 0.683). Given that exporters are more leveraged than non-exporters, internal cash are used for additional export markets in order to maintain a stable mix of financing sources. Finally product innovation ($NewProd$) is still positive and significant, as well as R&D dummy: product innovation continues to be an important aspect in the internationalization process of a firm.

6 *Ex-ante* and *ex post* effects

Furthermore, we find no evidence that firms enjoying better ex-ante financial health are more likely to start exporting, and strong evidence that participation in export markets improves firms' financial health. Greenaway

The final section is devoted to additional analysis. We will evaluate how a firm's financial health changes before (*ex-ante*) and after (*ex-post*) the beginning of export activity. The aim is to explore whether export activity changes financial status before or after the entry into foreign markets. The approach we use is similar to that of Bernard and Jensen (1999) in the analysis of self-selection and learning-by-exporting mechanisms in relationship with a firm's productivity. Bellone et al.(2010) use the same methodology to test the effect of entry on the firms' financial status. Similarly we implement the same methodology to test whether decision of entry by a firm can improve (or worsen) its financial situation, both *ex-ante* and *ex-post*.

Descriptive statistics provide mixed evidence. We know from Table B.6 that on average, new exporters show a lower debt/equity ratio (EquityR) but have a higher burden of debt relative to fixed assets (BK). If we consider the cluster average, the gap between new exporters and domestic firms widens because the new exporters are more likely ranked as credit-constrained. However, descriptive statistics are not sufficient. For this reason, we look at the variations in different financial indicators before and after entry, by comparison with domestic firms (continuos non-exporters). We run a simple OLS model using as dependent variables financial indicators in the year 2000 and, among regressors, the entry status in year 2003 - namely,

$$Y_{i00} = \alpha Entry_{i03} + \sum_{f} \beta_f X(f)_{i00} + \epsilon_i. \tag{6.1}$$

The Y_{i00} is a generic financial indicator[36], and the X_{00} re the control variables contemporaneous to the dependent variable. The idea of Eq. 6.1 is to verify how the entry decision in 2003 ($Entry_{i03}$) is anticipated by the financial variables Y_{i00}. A positive α coefficient indicates that the entrants have *ex-ante* a financial advantaged by comparison with domestic firms. Finally,

Table 6.1: Financial Status: Ex-Ante[‡].

	(1) Cluster$_{i00}$	(2) StIndex$_{i00}$	(3) Ln(CS)$_{i00}$	(4) Ln(CF)$_{i00}$	(5) EquityR$_{i00}$
Entry$_{i03}$	-0.079**	-0.173	0.059	-0.010	-0.247*
	[0.034]	[0.154]	[0.069]	[0.090]	[0.127]
TFP$_{i00}$	0.045**	0.043	0.311***	0.383***	0.105
	[0.019]	[0.087]	[0.082]	[0.109]	[0.085]
Log(KL)$_{i00}$	-0.007	0.022	0.287***	0.471***	-0.072
	[0.008]	[0.031]	[0.044]	[0.038]	[0.062]
Log(L)$_{i00}$	0.084***	0.342***	0.855***	0.756***	0.140
	[0.025]	[0.102]	[0.058]	[0.085]	[0.095]
Banks$_{i00}$	-0.038***	-0.133***	-0.025*	0.005	0.068**
	[0.004]	[0.015]	[0.013]	[0.016]	[0.026]
R&D$_{i00}$	0.016	0.031	-0.080*	-0.109	-0.079
	[0.050]	[0.151]	[0.039]	[0.064]	[0.156]
Cons.	0.145	1.695***	1.319***	-0.111	-1.046
	[0.150]	[0.513]	[0.291]	[0.418]	[0.737]
Obs.	651	651	647	640	651
r2	0.124	0.118	0.699	0.643	0.055

[‡] OLS estimator. *Cluster* assumes value 0, 1, 2, and 3. Robust standard errors are in squared brackets. Sector and region dummies included. Significance level: * is the p-value>0.1, ** is the p-value>0.05, and *** is the p-value>0.01.

Table 6.1 reports the estimation results for equation 6.1. In columns 1 and 2, we note that the firms' financial health, measured by *Cluster* and *StIndex*, is lower for future exporters; the entry into the export market undermines a firm's financial stability. We observe that the financial reliability shrinks *ex-ante* for new exporter, even if *EquityR* ratio decrease (ratio of debt to equity). The reduction of financial health can be generated by funds raising activity, which is necessary to finance the future entry in the export market; however the increase in the relative burden of equity (*EquityR*) can be caused by an expansion of collaterals to guarantee financial stability[37]. The results we obtain are similar to those of Greenaway et al.(2007), which show that new entrants usually have high leverage before entry, because the existence of sunk

[36] In Table 6.1, the cluster index and the continuous index (Eq. 4.2) are defined using time-variant ratios instead of averages from 1996 to 2003. $Cluster_{i00}$ is the discrete clustering variable that assumes values 0, 1, 2 and 3, while the $StIndex_{i00}$ is the time-variant standardized index for year 2000.

[37] In order to obtain loans the firm may be forced by lenders (i.e., banks) to increase equity. New equity is a collateral for new loans.

cost associated with exporting forces firms to use external funds. Finally, it seems that there are not *ex-ante* differences in liquidity level between entrants and domestic firms (columns 3 and 4). The result corroborates the idea that cash matters only for more constrained firms, because there are no *ex-ante* differences in term of liquidity among new exporters and domestic firms. It confirms the robustness of the methodology proposed to identify *a priori* the firm's credit constraint level. Concerning relationships with financial institutions, we note that the number of banks ($Bank$) is negatively correlated with the indices, suggesting that when more banks are available, it increases the relative burden of external debt (columns 1, 2 and 5). However, efficiency (TFP) and capital intensity (KL) are positively correlated with the indices at least for the sub-sample of firms considered: more efficient capital-intensive firms are in better a financial position, and they generate more liquidity.

Now we focus our attention on the *ex-post* effect of export entry. For this purpose, we need to use an additional survey that covers the period 1995-1997 (the 7th Capitalia Survey). The matching between the three surveys allow us to follow only 197 firms. We consider in this additional exercise continuous non-exporters and entrants in 2000 (that continue exporting in 2003). We perform the same exercise that Bernard and Jensen (1999) did to test the existence of al learning-by-exporting effect; in other words we are going to estimate the average difference, in term of financial stability, between new exporter and domestic firms. Unlike above, we estimate the effect of entry in the year 2000 on the indices reported in the year 2003. The estimation's results are in Table 6.2. They suggest that exporting does not affect firms' financial health ($Cluster$ or $StIndex$), nor cash stock/flows, nor equity ratio. The results are, again, very close to the findings of Bellone et al. (2010), for which export activity has no an *ex-post* effect on the firm's financial variables. However, future financial health is associated with a higher level of past efficiency (TFP), capital intensity (KL) and workforce dimension (Lab). $Bank$ has a negative and significant sign, which suggests that firms with high leverage use a greater variety of external financings' sources (i.e., banks), rather than firms with low leverage level. However we cannot draw any robust conclusion given the number of observations available.

Table 6.2: Financial Status: Ex-Post[‡].

	(1) Cluster$_{i03}$	(2) StIndex$_{i03}$	(3) CS$_{i03}$	(4) CF$_{i03}$	(5) EquityR$_{i03}$
Entry$_{i00}$	0.129	0.221	0.211	0.312	0.017
	[0.137]	[0.352]	[0.161]	[0.208]	[0.060]
TFP$_{i00}$	0.398***	1.137**	0.767***	1.170***	0.104
	[0.129]	[0.385]	[0.144]	[0.169]	[0.094]
Log(KL)$_{i00}$	0.013	0.167	0.313***	0.486***	0.058
	[0.054]	[0.111]	[0.062]	[0.046]	[0.035]
Log(L)$_{i00}$	0.172**	0.594*	0.913***	0.786***	0.194**
	[0.077]	[0.302]	[0.094]	[0.102]	[0.064]
Banks$_{i00}$	-0.051*	-0.188**	-0.007	0.037	0.007
	[0.024]	[0.071]	[0.028]	[0.027]	[0.015]
R&D$_{i00}$	-0.001	-0.053	-0.320*	-0.232	0.092
	[0.075]	[0.228]	[0.156]	[0.156]	[0.056]
Cons.	-1.237*	-2.618	0.271	-1.768*	-1.193*
	[0.578]	[1.847]	[0.967]	[0.827]	[0.557]
Obs.	195	195	192	189	195
R^2	0.256	0.299	0.668	0.700	0.297

[‡] OLS estimator. Robust standard errors are in squared brackets. Sector and region dummies included. Significance level: * is the p-value>0.1, ** is the p-value>0.05, and *** is the p-value>0.01.

7 Conclusions

Exporting is an activity that entails several costs, and most of them are sunk costs associated with the first entry. In real world, the new exporter faces a well defined entry costs against an uncertain future profit. If we assume the existence of asymmetric information and imperfect capital markets, not all potential exporters can begin export activity. Throughout this paper, we discuss the impact of financial resources on the probability of entry into the export market, and we assess the importance of firms' credit constraints. We consider the entry costs as an investment, it appears natural that internal liquidity may affect the entry choice in particular for constrained firms.

The contribution of this paper is twofold. On the one hand, we develop a methodology for identifying a priori the level of a firm's financial health, borrowing insights from the literature on investments' sensitivity on cash flows, and using indices from business economics. On the other hand, we empirically evaluate whether the level of internal resources affects both the firm's participation in international markets.

We find that the internal resources are an important factor for the internationalization of firms, and in particular the entry is determined by the level of cash stock for those firms identified as credit-constrained. In addition it seems that the financial resources are used to develop new products, or improve the existing ones, to make exports profitable. In case of new exporter

product innovation is the only relevant investments, while in the case of an expansion in the extensive margin of trade also product upgrading becomes important.

In addition, this paper also controls for the variation in the firms' financial health before and after entry. In line with part of the literature, we find that new exporters show lower financial stability, and that new exporters do not gain financial stability after the entry (Bellone et al., 2010)

As our analysis is based on a relatively small sample, further work is needed to understand the mechanisms through which liquidity affects the internationalization process of medium and small-sized firms.

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A Data Description

- **Financial Independency Index** (FII): This index measures how much of a firm is financing by itself. It is the ratio of internal resources or net assets (equity, reserves, profits) to the total assets employed by the firm.
- **Quick Ratio**: This is the amount of instantaneous liquidity plus postponed liquidity over short-term debts.
- **EquityR**: This is the ratio of long-term debt to the firm's equity.
- **Bond** is the value of long-term debt.
- **Cash Flow** (CF) is a measure of liquidity. Cash flows are profits plus depreciation and amortizations' founds plus worker leave indemnity (TFR).
- **Cash Stock** (CS) is a broader measure of liquidity as compared to CF. It includes liquid assets plus normal cash flows.
- **Log(L)**: It is the log of labour force, number of workers
- **K** is the deflated value of total fixed assets (tangible and intangible assets).
- **Log(KL)**: It is the log of capital intensity, namely the ratio of total fixed asset to labor force.
- **DA** is the value of depreciation and amortization.
- **Inv** are the investments in tangible (m) and intangible (s) assets. They are defined as

$$Inv_{ijt} = K_{ijt} - (1 - \delta_j)K_{ijt-1} \quad \text{with} \quad \delta_m = .10 \ \text{ and } \ \delta_s = .20 \tag{A.1}$$

  with j defining an asset's typology (tangible or intangible).
- **KB**: Total fixed assets at the beginning of the year t (Love, 2003). They are defined as

$$KB_{it} = K_{it} - Inv_{it} + DA_{it} \tag{A.2}$$

- **Dest** is the number of markets served reported in a given survey.

- **Expo** is the export dummy for a given survey.
- **Bank** is the number of banks used by a firm reported in a given survey.
- **UpProd**: It is a dummy variable used to define the investment's level in the upgrading of existing products during the survey period. The questionnaires ask if the level of resources invested in product upgrading is high (H), medium (M), or low (L): the corespondent dummy assumes value one if the effort is high (H), medium (M), or low (L).
- **NewProd**: It is a dummy variable used to define the investment's level for the creation of new products during the survey period. The questionnaires ask if the level of resources invested in product development is high (H), medium (M), and low (L): the corespondent dummy assumes value one if the effort is high (H), medium (M), or low (L).
- **R&D**: It is a dummy variable that takes value one if a firm invested in R&D during the survey period.
- **Deloc**: It is a dummy variable that takes value one if a firm delocalized production during the survey period.

B Descriptive Statistics

Table B.1: Financial Indicators[‡].

Sector	FII		Quick		EquityR		StIndex		Index	
	μ	σ	μ	σ	μ	σ	μ	σ	μ	σ
DA	0.245	0.179	0.957	1.159	0.458	1.197	1.022	0.779	0.797	1.134
DB	0.257	0.358	1.106	0.966	0.242	0.830	1.028	0.964	0.945	1.222
DC	0.231	0.168	1.089	3.043	0.218	0.630	1.014	0.881	0.695	1.085
DD	0.273	0.159	0.980	0.591	0.293	0.677	1.044	0.567	0.835	1.169
DE	0.232	0.177	1.158	0.899	0.353	1.547	1.011	0.683	0.958	1.165
DG	0.294	0.190	1.132	0.850	0.294	0.911	1.021	0.961	1.162	1.314
DH	0.281	0.193	1.110	0.641	0.244	0.835	1.026	0.588	1.186	1.277
DI	0.317	0.189	1.126	1.486	0.279	1.122	1.023	0.608	1.253	1.303
DJ	0.257	0.195	1.044	0.731	0.434	1.966	0.991	0.656	0.972	1.231
DK	0.271	0.194	1.084	0.746	0.242	1.134	1.009	0.635	0.991	1.244
DL	0.264	0.204	1.141	0.729	0.183	2.276	0.998	0.695	1.044	1.281
DM	0.233	0.172	0.862	0.437	0.904	3.229	0.991	0.626	0.874	1.193
DN	0.257	0.188	1.025	0.724	0.469	1.976	1.021	0.664	0.874	1.217

[‡] Source: Capitalia. Averages and standard deviation are calculated from 1997 to 2003. StIndex is the continuos standardized index from Eq 4.2. Index is the ranking index. μ: average. σ: standard deviation. Equity Ratio is the ration between the long term debt and the equity level. As it reduces the share of external financing shrinks compared to equity.

Table B.2: Descriptive Statistics‡.

ATECO CODE	Description	Firms	Percent	Turnover	Workers	TFK	AV	KL	Wage
DA	Food, Beverages & Tobacco	454	9.73	22970.74	86.12	4966.44	4892.55	103.59	28.19
DB	Textile and wearing apparel	564	12.08	17818.26	85.88	3374.05	4609.20	50.05	36.46
DC	Leather	223	4.78	8973.61	41.53	942.59	1925.01	28.46	29.33
DD	Wood products	140	3.00	8868.28	46.08	3059.82	2702.73	53.45	25.55
DE	Publishing	276	5.91	12708.91	72.44	2150.32	3918.48	51.04	28.78
DG	Chemical products and synthetic fibers	206	4.41	62896.12	163.06	11745.81	12720.06	72.95	42.63
DH	Plastic and rubber products	236	5.06	12530.05	70.69	3453.69	4049.86	109.73	69.09
DI	Other non metallic and mineral products	255	5.46	17962.35	96.72	5995.14	6825.88	76.17	29.08
DJ	Manufacture of basic metallic products	787	16.86	14307.62	61.69	3079.01	3320.55	50.93	30.80
DK	Machinery and equipment	642	13.75	20310.87	114.36	3152.49	6673.33	247.23	63.01
DL	Manufacture of electrical machinery	438	9.38	28917.2	150.92	7259.47	10511.99	45.82	41.12
DM	Manufacture of motor vehicles	130	2.78	74913.75	259.46	18978.35	18166.85	72.45	32.42
DN	Other manufacture: house furniture	312	6.79	9349.53	48.49	1486.34	2483.10	39.19	28.53
	Total	4,668	100	20751.41	93.26	4416.99	5697.85	87.49	38.69

‡ Source: Capitalia. TFK: Tangible fixed assets. AV: added Value in Th of Euros. KL: Capital intensity, fixed assets per worker. Wage: Average wage, total wage bill over total number of workers. The values variables are deflated with sector specific year deflators (Eu-Klems).

Table B.3: Firms' survey in 2000 and 2003.‡.

Des \ Ask	2000			2003		
	No	Yes	Total	No	Yes	Total
No	3,454	67	3,521	0	0	0
Yes	660	240	900	212	125	337
Total	4,114	307	4,421	212	125	337

Transitional Matrix

2000 \ 2003	Ask			Desire		
	No	Yes	Total	No	Yes	Total
No	211	0	211	1,415	181	1,596
Yes	0	122	122	214	137	351
Total	211	122	333	1,629	318	1,947

‡ Source: Capitalia. Ask: firm asks for more credit without getting it. Desire: firms would have desired more credit from the banks. In the cells are reported the number of firms.

Table B.4: Transitional Matrix: Export Status‡.

2000 \ 2003	Domestic	Exporter	Total
Domestic	656	122	778
Exporters	530	1246	1776
Total	1186	1368	2554

1997 \ 2000	Domestic	Exporter	Total
Domestic	167	38	205
Exporters	41	565	606
Total	208	603	811

‡ Source: Capitalia.

Table B.5: Transitional matrix: Export destination‡.

2000 \ 2003	0	1	2	3	4	5	6	7	8	9	Total
0	660	175	134	88	48	29	31	14	9	13	1,201
1	81	188	84	24	7	2	1	2	0	1	390
2	25	82	121	63	12	9	2	0	1	1	316
3	10	35	78	63	34	10	8	2	3	6	249
4	0	6	34	38	22	12	11	12	6	3	144
5	3	3	20	21	18	24	4	7	0	3	103
6	0	3	6	11	11	6	6	4	7	2	56
7	0	0	3	4	5	4	3	6	4	2	31
8	3	0	2	5	6	7	2	2	7	1	35
9	1	1	4	4	2	3	4	3	4	3	29
Total	783	493	486	321	165	106	72	52	41	35	2554

‡ Source: Capitalia. In the cells are reported number of firms. In first row and fir column are reported the number of regions served respectively in 2003 and 2000. Firms do not change.

Table B.6: Averages by export status‡.

	All Firms	Continuos	Domestic	Entr03
Index	0.960	0.946	1.086	0.683
TFP	4.411	3.939	5.250	4.698
Ln(CS)	7.075	7.358	6.540	6.714
Labor	98.28	123.89	39.070	92.71
BK	0.300	0.357	0.189	0.208
EquityR	0.248	0.245	0.239	0.175
Obs	2554	1186	656	122

‡ Simple averages across firms with export status information both in the 8^{th} and 9^{th} survey. Index: time variant cluster index. TFP: Levinsohn Petrin productivity. Labor: Workforce. BK: Long term debts over total assets. EquityR: equity ratio. Obs: Observations. Continuos: continuos exporters in both surveys. Domestic: non exporters in both surveys. Entr03: entrants in export market in 9^{th} survey.

Table B.7: Euler Equation: System GMM by cluster[‡].

	(1) All	(2) CL0	(3) CL1	(4) CL2	(5) CL3
IKB_{it-1}	-0.019	0.019	-0.228**	0.010	-0.013
	[0.037]	[0.036]	[0.094]	[0.226]	[0.096]
CSK_{it-1}	0.016***	0.013***	0.088**	-0.059	-0.018*
	[0.001]	[0.001]	[0.035]	[0.081]	[0.010]
YK_{it-1}	-0.000***	-0.000***	-0.007	0.004	0.012***
	[0.000]	[0.000]	[0.005]	[0.011]	[0.004]
TFP_{it-1}	0.010*	-0.005	0.010	-0.013	0.006
	[0.005]	[0.012]	[0.014]	[0.013]	[0.009]
$EquityR_{it-1}$	-0.065	0.065	0.104	0.146	0.205
	[0.060]	[0.090]	[0.169]	[0.450]	[0.463]
Const	0.107***	0.130***	-0.015	0.251***	0.020
	[0.032]	[0.049]	[0.130]	[0.087]	[0.061]
Obs.	9759	5370	1441	682	2266
Firms	2459	1358	373	172	556
Instr.	49	49	49	49	49
AR2 Test	0.368	0.334	0.886	0.312	0.291
Hansen Test	0.325	0.868	0.653	0.231	0.431

[‡] System GMM estimation. Robust standard errors in squared brackets. Time dummies included both as variables and instruments. One step estimator used. Significance level: * is the p-value>0.1, ** is the p-value>0.05, and *** is the p-value>0.01. Instr: total number of instruments. P-Value reported for AR2 Test and Hansen test. Firms included in the estimation are the result of matching between balance sheet 1991-2000 and 2001-2003. All regressors are considered endogenous and are instrumented from the 3rd lag. Investments, sales and cash stock are scaled with the capital value at the begin of period.

Table B.8: Euler Equation: time variant and standardized indicator‡.

	Diff-GMM (1)	Sys-GMM (2)	Diff-GMM (3)	Sys-GMM (4)	Diff-GMM (5)	Diff-GMM (6)
IKB_{it-1}	-0.480***	-0.097*	-0.633***	-0.072	-0.375***	-0.514***
	[0.169]	[0.058]	[0.211]	[0.047]	[0.069]	[0.141]
$CSKB_{it-1}$	-0.010	-0.002			0.014***	
	[0.009]	[0.009]			[0.004]	
X0*$CSKB_{it-1}$	0.019**	0.017*				
	[0.009]	[0.009]				
X1*$CSKB_{it-1}$	0.118***	0.094***				
	[0.030]	[0.036]				
X2*$CSKB_{it-1}$	-0.054	0.037				
	[0.211]	[0.077]				
$CFKB_{it-1}$			0.012	-0.015		0.017**
			[0.094]	[0.019]		[0.008]
X0*$CFKB_{it-1}$			0.004	0.043**		
			[0.096]	[0.019]		
X1*$CFKB_{it-1}$			0.199*	0.231***		
			[0.119]	[0.061]		
X2*$CFKB_{it-1}$			-0.213	0.009		
			[0.380]	[0.197]		
Stind*$CSKB_{it-1}$					-0.004	
					[0.003]	
Stind*$CFKB_{it-1}$						0.004
						[0.008]
$Stind_{it-1}$					0.051	-0.063
					[0.221]	[0.218]
YKB_{it}	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
TFP_{it-1}	0.105	-0.015	-0.008	-0.013	-0.007	-0.476
	[0.117]	[0.019]	[0.139]	[0.017]	[0.392]	[0.451]
$EquityR_{it-1}$	0.088	0.008	0.180	0.064	0.105	0.169*
	[0.118]	[0.051]	[0.138]	[0.079]	[0.086]	[0.091]
Constant		0.189**		0.157**		
		[0.088]		[0.068]		
Obs.	7258	9759	7258	9759	7258	7258
Firms	2209	2459	2209	2459	2209	2209
AR2 Test	0.444	0.439	0.116	0.390	0.851	0.264
Hansen Test	0.420	0.099	0.364	0.137	0.753	0.234
Instr.	66	98	66	98	52	52

‡ Difference GMM estimation. Variables in log. Robust standard errors in squared brackets. Time dummies included both as variables and instruments. One step estimator used. Significance level: * is the p-value>0.1, ** is the p-value>0.05, and *** is the p-value>0.01. Instr: total number of instruments. P-Value reported for AR2 Test and Hansen test. CL is the time constant cluster. Firms included in the estimation are the result of matching between balance sheet 1991-2000 and 2001-2003. All regressors are considered endogenous and are instrumented from the 3rd lag. Investments, sales and cash stock are scaled with the capital value at the beginning of period KB.

Table B.9: Unconditional and conditional probability - mean 2001/2003‡.

	A	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Cluster	P(E)	P(E|CS)	P(E|CS;X)	P(E|CS;X)	P(E|CS;X)	P(E|CS;X)	P(E|CS;X)	P(E|CS;X)
0	0.188	0.264	0.311	0.320	0.310	0.318	0.308	0.350
1	0.121	0.242	0.204	0.209	0.206	0.184	0.191	0.200
2	0.148	0.267	0.284	0.280	0.269	0.286	0.283	0.267
3	0.117	0.265	0.205	0.212	0.209	0.200	0.205	0.233
Overall	0.157	0.261	0.268	0.275	0.267	0.266	0.264	0.293

‡ P(E) is the unconditional entry probability. P(E|CS) is the probability of entry conditional to cash stocks. P(E|CS;X) is the entry probability conditional to cash stock and clustering.